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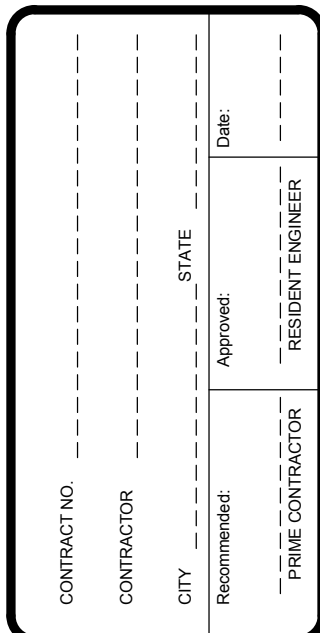
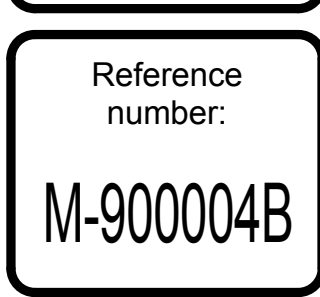
15. HYDRONIC WATER RETURN LINES SHALL NOT HAVE BULLHEAD CONNECTIONS.
16. HYDRONIC PIPING SHALL HAVE MANUAL AIR VENTS AT ALL HIGH POINTS. PROVIDE DRAIN VALVES WITH REMOVABLE PLUG AT THE BOTTOM OF VERTICAL PIPE RISERS AND AT ALL LOW POINTS TO DRAIN PIPES.
17. FOR PLUMBING PIPING DETAILS REFER TO PLUMBING SERIES DRAWINGS.

1. ALL HVAC PENETRATIONS IN FIRE WALLS SHALL HAVE FIRE SMOKE DAMPERS. ALL FIRE DAMPERS, SMOKE DAMPERS, AND FIRE/SMOKE DAMPERS SHALL BE INSTALLED IN ACCORDANCE WITH SHEET METAL AND AIR CONDITIONING NATIONAL ASSOCIATION (SMACNA) SMOKE, AND RADIATION DAMPER INSTALLATION GUIDE FOR HVAC SYSTEMS, UL, IBC, AND DAMPER MANUFACTURER'S RECOMMENDATIONS
2. ALL RECTANGULAR DUCT ELBOWS SHALL HAVE TURNING VANES UNLESS NOTED OTHERWISE. ALL UNEQUAL TURNING VANES SHALL HAVE SINGLE-THICKNESS TURNING VANES WITH TRAILING EDGE. NOT ALL TURNING VANES ARE INDICATED ON THE DRAWINGS.
3. ALL DUCT SHALL BE SEAL CLASS A IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS UNLESS NOTED OTHERWISE.
4. ALL DUCT SIZE DIMENSIONS INDICATED ON THE DRAWINGS ARE CLEAR INSIDE DIMENSIONS.
5. ALL HVAC PENETRATIONS EQUAL OR GREATER THAN 96 SQUARE INCHES AND ALONG THE SECURE BOUNDARY SHALL HAVE SECURITY MAN BARS AND INSPECTION PORT INSTALLED ON THE SECURE SIDE OF THE WALL.
6. MAXIMUM LENGTH OF FLEX DUCT SHALL BE 6 FEET.
7. DUCT SMOKE DETECTORS WHERE SHOWN ON PLANS OR DETAILS SHALL BE INSTALLED PER NFPA 72E, 90A AND MANUFACTURER'S REQUIREMENTS. ACCESS PANEL TO THE DETECTORS SHALL BE PROVIDED.
8. CONTRACTOR CAN USE EQUIVALENT ROUND DUCTWORK IN LIEU OF RECTANGULAR DUCTWORK, WHERE SPACE IS AVAILABLE.
9. DUCT AND PLENUM ACCESS PANEL/DOORS SHALL BE PIANO HINGED, GASKETED AND DOUBLE SASH LOCKED.
10. CEILING DIFFUSER, RETURN AND EXHAUST GRILLE SIZES SHOWN ON PLANS AND IN EQUIPMENT SCHEDULES ARE NECK SIZE. USE LONG RADIUS ELBOW FITTING WHEN PHYSICAL SPACE ALLOWS. SHORT RADIUS ELBOW FITTINGS SHALL HAVE TURNING VANES. 90 DEGREE SQUARE ELBOWS WITH TURNING VANES SHALL ONLY BE USED WHERE THE RADIUS ELBOW INSTALLATION IS NOT POSSIBLE DUE TO SPACE LIMITATION. NUMBER AND LOCATION OF TURNING VANES (SPLITTERS) SHALL BE PER SMACNA.
11. PROVIDE MANUAL VOLUME DAMPERS IN EACH BRANCH OF RETURN AIR, EXHAUST AIR, SUPPLY AIR DUCT AND DOWNSTREAM OF VAV BOXES. PROVIDE ADEQUATE NUMBER OF DAMPERS AS REQUIRED FOR COMPLETE BALANCING WITHOUT THE USE OF OPPOSED BLADE DAMPERS PROVIDED WITH THE DIFFUSERS AND / OR REGISTERS.
12. INSTALLATION SHALL ACCOMMODATE READY ACCESS TO DAMPERS, COILS AND OTHER DEVICES. ACCESS DOORS SHALL BE INSTALLED TO PROVIDE ADEQUATE CLEARANCES FOR DIRECT ACCESS.
13. ALL VOLUME DAMPERS ABOVE GYPSUM BOARD HARD CEILINGS SHALL BE FURNISHED WITH REMOTE DAMPER OPERATOR.
14. UNLESS OTHERWISE NOTED, ROUTE ALL DUCTWORK AND PIPING ABOVE CEILINGS. ROUTE ALL DUCTWORK AND PIPING AS HIGH AS POSSIBLE IN AREAS WITHOUT CEILINGS.
15. UNLESS OTHERWISE NOTED, PROVIDE DUCT RUNOUTS TO TERMINAL UNITS SAME SIZE AS TERMINAL UNIT INLET. INSTALL CALIBRATED BALANCING VALVES AND VENTURIS WITH A MINIMUM UNRESTRICTED STRAIGHT RUN OF 5 PIPE DIAMETERS UPSTREAM AND 3 PIPE DIAMETERS DOWNSTREAM.
16. ALL OUTSIDE AIR INTAKES, RELIEF AIR, AND EXHAUST DAMPERS SHALL BE LOW LEAKAGE DAMPERS. THE LOW LEAKAGE DAMPERS WILL HAVE MAXIMUM LEAKAGE RATES OF 3 CFM/SQ FEET WITH A DIFFERENTIAL PRESSURE OF 1" WG ACROSS THE DAMPER.
17. FOR HVAC DETAILS, REFER TO SHEETS MH900501B THRU MH900506B.
18. ALL DUCTWORK EXCEPT NOTED BELOW SHALL BE GALVANIZED STEEL. USE STAINLESS STEEL EXHAUST DUCT FOR THE FIRST 15 FEET OF SHOWER EXHAUST AND OUTDOOR DUCTWORK. GRILLES IN SHOWER SHALL BE OF STAINLESS STEEL.
19. PROVIDE WAVEGUIDE CLEANING PORT FOR ALL DUCTED EMI WAVEGUIDE.

1. INSTRUMENT PIPING CONNECTIONS ARE NOT DIMENSIONED ON THE DRAWINGS. THE CONNECTION LOCATIONS SHOWN ARE INTENDED TO SERVE AS A GENERAL GUIDE ONLY TO ILLUSTRATE THE DESIRED LOCATIONS OF THE CONNECTIONS. FOR INSTRUMENT CONNECTIONS NOT IDENTIFIED ON PIPING DRAWING REFER TO PIPING OR AIRFLOW AND INSTRUMENTATION DIAGRAMS FOR RELATIVE LOCATIONS. THE CONTRACTOR SHALL AVOID INTERFERENCE WITH OTHER INSTRUMENT CONNECTIONS, PIPING, EQUIPMENT, AND THE WORK OF OTHER DISCIPLINES. WHERE PRESSURE AND TEMPERATURE CONNECTIONS ARE SHOWN ADJACENT TO EACH OTHER, A MINIMUM DISTANCE OF 300 mm. SHALL BE MAINTAINED BETWEEN INSTRUMENT CONNECTIONS WHERE POSSIBLE.
2. ALL PRESSURE INSTRUMENTATION SHALL BE FOR 3/4" DIA PIPING. TEMPERATURE TAPS SHALL BE SUITABLE FOR THERMOWELL, IN NO CASE LESS THAN 3/4". ALL PRESSURE INSTRUMENTATION SHALL BE PROVIDED WITH A 3/4" ISOLATION BALL VALVE.
3. INSTRUMENTATION (FOR EXAMPLE, PI, TI, PDI) IS NOT ALL SHOWN ON PLAN DRAWINGS. CONTRACTOR SHALL PROVIDE INSTRUMENTATION AS INDICATED ON CONTROL DIAGRAMS AND SHALL LOCATE DEVICES SUCH THAT A PERSON CAN EASILY READ GAUGE WHILE STANDING ON FLOOR.
4. THERMOSTATS AND ROOM TEMPERATURE TRANSMITTERS SHALL BE MOUNTED 5 FEET AFF UNLESS NOTED OTHERWISE. SENSORS MOUNTED ON THE EXTERIOR WALL SHALL HAVE INSULATION, BLOCK BACKING.
5. FOR THERMOSTATS AND ROOM TEMPERATURE TRANSMITTER TAGS REFER TO INSTRUMENTATION DRAWINGS.
6. POINT LIST PROVIDED ARE MINIMUM REQUIRED POINTS. PROVIDE ADDITIONAL POINTS AND INSTRUMENTATION TO PROVIDE COMPLETE OPERABLE SYSTEM IN COMPLIANCE WITH THE SEQUENCE OF OPERATIONS AND DIAGRAMS THE BMS SHALL TREND EVERY 15 MINUTES (INITIAL SETTING) FOR EACH POINT IDENTIFIED IN THE POINT LIST TO BE TRENDED, UNLESS NOTED OTHERWISE. ALL SET POINTS SHALL BE ADJUSTABLE AT BMS LOCALLY AND REMOTELY AT BUILDING 800.
7. CONTROL/POWER WIRING REQUIRED BUT NOT SHOWN FOR AND NOT LIMITED TO THERMOSTATS, VARIABLE FREQUENCY DRIVE CONTROLS, EQUIPMENT MANUFACTURER CONTROL PANELS, DAMPER MOTORS, VALVES, SENSING DEVICES (TEMPERATURE, PRESSURE, HUMIDITY, LEVEL, FLOW, VOLUME, ON-OFF, FIRE ALARM DEVICES) AND OTHER MECHANICAL/ FIRE PROTECTION/PLUMBING EQUIPMENT REQUIRING CONTROL WIRING SHALL BE SUPPLIED AND INSTALLED TO PROVIDE A COMPLETE AND USABLE FACILITY. INSTALL CONTROL WIRING IN METAL CONDUITS AS PER SPECIFICATIONS.
8. THE BMS SHALL BE PROVIDED WITH INPUT AND OUTPUT HARDWARE TO FORM A COMPLETE AND INTEGRATED SYSTEM PER SEQUENCE OF OPERATION AND I/O POINT LIST.

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5. SUPPORT INSTALLATION, CONTROL VALVE AND MOTOR OPERATED VALVE OPERATORS HEAVIER THAN 20 LBS. SHALL BE BRACED FOR SEISMIC LOADS.
6. ALL PIPE SUPPORTS AND SEISMIC BRACING

[illegible]

NOT FOR CONSTRUCTION